EXAMINATION I:

Corporate Finance - Economics

Financial Accounting and Financial Statement Analysis

Equity Valuation and Analysis

Solutions

Final Examination

March 2006
Question 1: Economics (40 points)

a)
a1) Purchasing power parity (PPP) rests on the assumption that any given item will have the same price worldwide when measured in the same currency (the law of one price). Knowing the price of the item in two countries, one can easily calculate the equilibrium exchange rate. If one generalizes the law of one price to a basket of goods, as measured by price indices, we get the following absolute PPP relation:

\[
S_{\text{Yuan/USD}} = \frac{P_{\text{China}}}{P_{\text{US}}}
\]

where: 
- \( S = \) exchange rate
- \( P = \) price index

Relative PPP looks at the development of relative prices between the two countries over time. The relative change in the exchange rate depends on the difference between the inflation rates of the two countries. The country with the higher inflation rate will have a depreciating currency, whereby the rate of depreciation is equal to the difference in the two inflation rates:

\[
s_{t-1,t} = p_{t-1,t} - p_{t-1,t}
\]

where:
- \( s_{t-1,t} = \) change in exchange rate between \( t-1 \) and \( t \)
- \( p_{t-1,t} = \) domestic inflation rate between \( t-1 \) and \( t \)
- \( p_{f,t-1,t} = \) foreign inflation rate between \( t-1 \) and \( t \)

a2) - Definition:

The Marshall-Lerner (M-L) condition gives the condition where net exports (NX) will rise when the domestic currency depreciates or is devalued (\( S_{\text{real}} \) changes). The Marshall-Lerner condition is given by:

\[
\frac{\Delta X}{X} - \frac{\Delta M}{M} - \frac{\Delta S_{\text{real}}}{S_{\text{real}}} > 0 \quad \text{or} \quad \frac{\Delta X}{X} = \frac{\Delta M}{M} - \frac{\Delta S_{\text{real}}}{S_{\text{real}}} > 1
\]

Thus, it can be shown that a revaluation/appreciation of a currency will worsen the trade balance/current account of a country if the proportional change in exports, minus the proportional change in imports minus the proportional change in the real exchange rate is positive.

- Effects:

Thus the revaluation of the Yuan will deteriorate the Chinese current account in case the proportional change in exports, minus the proportional change in imports is greater than the proportional change in the real exchange rate.

However, if the proportional change in net exports is less than the proportional change in the real exchange rate, then the current account will improve.
A revaluation of the Yuan will make Chinese exports more expensive (in terms of dollars) and Chinese imports cheaper (in terms of Yuan). Therefore, exports will fall as the Chinese goods will not be competitive and imports might rise because they have become cheaper. Thus, (+ M-L condition) net exports will worsen and aggregate demand will go down. The drop in demand will result in a lower output, and a lower interest rate.

For the graphical analysis we use the IS-LM framework. The change in net exports affects the goods market equilibrium, i.e. the IS curve shifts to the left. The equilibrium shifts from point A to point B. Thus, the output falls (and also the interest rate goes down).

a3)
In the medium-run:
Because of the revaluation of the Yuan, aggregate demand falls, i.e. the AD-curve shifts down/to the left. Equilibrium moves along the AS-curve from point A to point B (see question a2). In the medium-run wages do not react. Therefore, the new equilibrium will be below full employment. Thus the output would be lower at lower prices.

In the long-run:
In the long-run everything is flexible. Unemployment will lead to nominal wage reductions.

This will lead to a shift in the AS-curve to the right (reduction in costs) and the equilibrium will shift from point B to point C, until output is back to the full employment equilibrium – at a lower price level than initially.

b)
In the money market:

The money supply curve will shift to the left and the equilibrium interest rate will move up from $r_A$ to $r_B$. The LM curve moves upward (in the IS-LM framework) (LM to LM’). The output falls ($Y_A$ to $Y_B$) and the interest rate goes up.
In the overall economy:

In the AS/AD-framework, the AD-curve will move down/to the left because lower investment, lower consumption as well as lower net exports reduce aggregate demand (and the output Y).

Equilibrium will move to a lower output level (from $Y_A$ to $Y_B$) as well as to a lower price level (from $P_A$ to $P_B$). The US economy will cool off and the inflationary pressure will be reduced.
Question 2: Corporate Finance (40 points)

a) Accounts payable:
The implicit financing cost involved in settling the purchasing price for raw materials, etc. after a certain period of time has elapsed is presumably already included in the cost of sales since it is added to the purchasing price. Conceptually, therefore, it would be possible to include accounts payable in invested capital and at the same time estimate the implicit financing cost included in the purchasing price. However, little would be gained by doing this in comparison to the complexity of the calculations involved. It is therefore more practical not to include accounts payable in invested capital when estimating WACC.

Deferred tax:
Deferred tax represents the discrepancy in the timing of "corporate income taxes" in financial accounting with "payment of tax liabilities" in tax accounting. Until taxes are actually paid to the central or local government, the funds still belong to the shareholders and can earn money for them. In that sense, deferred taxes are "quasi-equity" in economic terms. However, this value should already be reflected as a component of the share price, so there is no need to consider deferred tax as a separate item from invested capital when estimating WACC, which is concerned with the prevailing market value of shareholders' equity.

b) ABC’s market-value capital structure is:

<table>
<thead>
<tr>
<th></th>
<th>Amount ($1 million)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term debt (@ 6.00%)</td>
<td>250</td>
<td>8.24%</td>
</tr>
<tr>
<td>Long-term debt (@ 8.10%)</td>
<td>800×0.98= 784</td>
<td>25.84%</td>
</tr>
<tr>
<td>Shareholders’ equity (@ 12.20%)</td>
<td>50×40= 2'000</td>
<td>65.92%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3'034</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

The cost of ABC’s shareholders’ equity is estimated from CAPM as:

$$E(R_{ABC}) = R_f + \beta_{ABC} \cdot (E(R_M) - R_f) = 5\% + 1.20 \cdot 6\% = 12.20\%$$

Therefore:

$$WACC = 6\% \cdot (1 - 0.4) \cdot \frac{250}{3,034} + 8.1\% \cdot (1 - 0.4) \cdot \frac{784}{3,034} + 12.2\% \cdot \frac{2,000}{3,034} = 9.59\%$$

c) Calculations of the after-tax WACC already take account of the corporate tax shield benefits from deductions of interest expense. If the benefits from interest deductions were included in cash flow calculations too, they would be counted twice. ABC avoids this.
d) 
Conclusion: do not agree.

Reasons:
1) Generally for an investment project to be adopted it must generate greater returns than the rate of return (cost of capital) demanded by the providers of funds (shareholders and creditors) from investment opportunities with equivalent risk. This project would increase capacity in mainline businesses, so its risk profile should be similar to the average risk profile of ABC as a whole. It is therefore more reasonable to apply the company-wide WACC as the discount rate because it reflects the capital structure for ABC as a whole.

2) The method by which investment funds are raised for a project has no direct bearing on the project's discount rate. The project itself does not bring ABC any increase in debt capacity. In addition, it does not have any impact on the target debt ratio.

e) 
e1) 
Asset beta = \[
\frac{\text{Equity beta}}{1 + (1 - \text{Corporate tax}) \cdot \frac{\text{debt}}{\text{Shareholders' equity}}} = \frac{1.2}{1 + (1 - 0.4) \cdot \frac{250 + 784}{2,000}} = 0.92
\]

e2) 
\( (\Delta \text{ corporate value}) = (\text{Corporate tax rate}) \cdot (\Delta \text{ in debt}) = 0.4 \cdot 300 = 120 \text{ million} \)

e3) 
If there is no signaling effect, share purchases do not by themselves impact the share price. All that needs be considered is the tax shelter effect from the increase in debt. Assuming that the interest rate on debt does not change, the 120 million euro increase in firm value from the tax benefits of debt will translate directly and fully into an increase in the market value of shareholders' equity. Therefore, the equity beta will be after change in capital structure:

\[
\begin{align*}
\text{Asset beta} &= \text{Equity beta} \cdot \frac{\text{Debt}}{\text{Shareholders' equity}} \\
&= 0.92 \cdot \frac{250 + (784 + 300)}{(2,000 - 300 + 120)} = 1.32
\end{align*}
\]

This results in the following estimation for cost of shareholders' equity:

Cost of shareholders' equity after change in capital structure = 5% + 1.32 \cdot 6% = 12.92%

One can compute the reduction of the WACC by first computing the WACC after the change in capital structure as follows:

\[
\begin{align*}
\text{WACC after change} &= 6\% \cdot \frac{250}{3,034 + 120} + 8.1\% \cdot 0.6 \cdot \frac{784 + 300}{3,034 + 120} + 12.92\% \cdot \frac{2,000 - 300 + 120}{3,034 + 120} = 9.41\%
\end{align*}
\]

The difference in the WACC before and after the change in capital structure is therefore: 9.59% - 9.41 = 0.18%. The WACC will decline by an estimated 0.18 percentage point.
Question 3: Equity Valuation and Analysis

a) Forecast earnings per share this year = E(EPS) = (BVPS of last year) · ROE
= 100 · 0.1 = 10 euros

Forecast dividends per share this year = E(DPS) = E(EPS) · (Payout ratio)
= 10 · 0.3 = 3 euros

Sustainable growth rate = g = ROE · (1 − Payout ratio)
= 0.1 · (1 - 0.3) = 0.07

Using the constant growth dividend discount model, the implied return (implied k_E) of JUN’s shares is:

\[
\text{Implied } k_E = \frac{E(DPS)}{\text{Share price}} + g = \frac{3}{95} + 0.07 = 0.1015
\]

Required rate of return under the capital asset pricing model (CAPM) = k_E
= Risk-free rate + Stock market risk premium · beta
= 0.03 + 0.07 · 1.1 = 0.107

The implied return of 10.15% is less than the required return of 10.70% under the CAPM, so JUN's shares are at a premium.

b) Forecast residual income per share this year:
= E(EPS) − BVPS · R_E = 10 − 100 · 0.107 = -0.7 euros

Earnings per share and book value per share will grow at the sustainable growth rate of 7% from next year onwards, so the residual income per share (or in this case, residual loss) will also increase by the sustainable growth rate of 7%.

Theoretical share price =
(BVPS at end of last year) + (PV of residual income per share in and after this year)
= 100 + \frac{-0.7}{0.107 − 0.07} = 81.08 euros

The theoretical price for JUN's shares is thus 81.08 euros, and the current price of 95 euros is at a premium.

With this approach, one obtains the same result as with the constant growth dividend discount model:

Theoretical price for JUN shares = \frac{E(DPS)}{k_E − g} = \frac{3}{0.107 − 0.07} = 81.08 euros
c) Even if the share price is below the liquidation value, JUN's shares are still at a premium to the theoretical price calculated from forecast earnings and dividends. Therefore, JUN’s shares should not be considered as an investment.

d) • Assuming the balance sheet accurately reflects the company's asset values, a PBR below 1 indicates that the shares are trading for less than the company's liquidation value, which makes the company a potential take-over target. If the company becomes a take-over target, the share price is likely to rise above the liquidation value, which would make it a good investment.

• Empirical evidence suggests that in most countries stocks with low PBRs have high risk-adjusted returns. Therefore, as a general rule a stock with a low PBR could be a promising investment.
Question 4: Financial Accounting  

(a) PV of the lease installments:

<table>
<thead>
<tr>
<th>Installments (1)</th>
<th>10’000</th>
<th>10’000</th>
<th>2’000</th>
</tr>
</thead>
<tbody>
<tr>
<td>discount factor (2)</td>
<td>1</td>
<td>(1+8%)</td>
<td>(1+8%)²</td>
</tr>
<tr>
<td>Installments PV</td>
<td>10’000</td>
<td>9’259.26</td>
<td>1’714.68</td>
</tr>
<tr>
<td>(3=1/2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV of lease installments</td>
<td></td>
<td></td>
<td>20’973.94</td>
</tr>
</tbody>
</table>

So at the inception of the contract:

- The *fair value* of the plant is CU 20’973.94
- The amount of financial debt is CU 20’973.94

*Calculation of the value of the plant at 31.12.2006:*

Initial carrying amount – depreciation of the year =
- Initial carrying amount 20’973.94
- Depreciation for the year (20’973.94/3) - 6’991.31
  = 13’982.62

*Calculation of the value of financial debt at 31.12.2006:*

Total interest of financial debt
= total debt (that is the sum of all lease payments) – present value of total debt
= 22’000 – 20’973.94 = 1’026.06

Financial Debt at 31.12.2006
= present value of lease payments remaining to be paid (1) + lease interests of the year (2)
  = 11’851.85 (or, if lease interests of the year are equal to 342.02, 11’315.96)

(1) = initial debt – first payment = 20’973.94 – 10.000 = 10’973.94
(2) Lease interests for 2006 = 8% · 10’973.94 = 877.92
but it could be acceptable (according to the handbook) 1’026.06/3 = 342.02

*Other possible answer:*
(1)=payment on Jan.1.2007=10,000
(2)=present value of payment on Jan.1.2008=2,000/(1+8%)=1,851.85

(b)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment (carrying amount)</td>
<td>7’000</td>
<td>0</td>
</tr>
<tr>
<td>Deferred taxes</td>
<td>1’350</td>
<td>0</td>
</tr>
<tr>
<td>Revaluation reserve</td>
<td>3’150</td>
<td>0</td>
</tr>
<tr>
<td>Depreciation of the year</td>
<td>2’500</td>
<td>7,000</td>
</tr>
</tbody>
</table>
For year 2007:
Carrying amount of the equipment as of 31.12.2006: 5'000 = 2/3 cost
⇒ Cost = 7'500
Depreciation taken to income statement = 7'500/3 = 2'500
⇒ Carrying amount before revaluation = 5'000 – 2'500 = 2'500
Carrying amount after revaluation = 7'000
⇒ Revaluation difference = 7'000 – 2'500 = 4'500
Deferred taxes on revaluation = 4'500 · 30% = 1'350
⇒ Revaluation reserve as of 31.12.2007 = 4'500 – 1'350 = 3’150

For year 2008:
Depreciation taken to income statement = 7'000/1 = 7’000
Deferred taxes are completely used in 2008 and the revaluation reserve is completely transferred to retained earnings

c)
c1)
As Viel Inc. has a “significant influence” without actually possessing control of Ice Inc., the candidate must use the equity method. It consists in replacing the book value of parent company’s shareholding by the relevant proportion of the subsidiary’s net assets.

c2)
Price paid for the investment in Ice Inc. 120'000
Corresponding share of Ice shareholders' funds: 300'000 · 20% = 60'000
⇒ Goodwill (initial amount) 60'000

c3)

<table>
<thead>
<tr>
<th>Extract from company Viel’s consolidated Balance Sheet as of 31 December N</th>
<th>CASE A</th>
<th>CASE B</th>
<th>CASE C</th>
<th>CASE D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment in Ice Inc.</td>
<td>180’000</td>
<td>100’000</td>
<td>130’000</td>
<td>120’000</td>
</tr>
<tr>
<td>of which: Goodwill</td>
<td>60’000</td>
<td>40’000</td>
<td>60’000</td>
<td>60’000</td>
</tr>
</tbody>
</table>

<p>| Extract from company Viel’s consolidated Profit and Loss account for year N | | | |
| Adjustments of the investment in Ice Inc. | + 60’000 | – 20’000 | + 10’000 | 0 |</p>
<table>
<thead>
<tr>
<th></th>
<th>Case A</th>
<th>Case B</th>
<th>Case C</th>
<th>Case D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shareholders' Funds of Ice as of 31.12.N-1 (1)</td>
<td>300’000</td>
<td>300’000</td>
<td>300’000</td>
<td>300’000</td>
</tr>
<tr>
<td>Ice's profit (loss) in year N (2)</td>
<td>300’000</td>
<td>(100’000)</td>
<td>100’000</td>
<td>0</td>
</tr>
<tr>
<td>Dividends distributed (3)</td>
<td>-</td>
<td>-</td>
<td>(50’000)</td>
<td>-</td>
</tr>
<tr>
<td>Shareholders' Funds of Ice as of 31.12.N (1+2+3)</td>
<td>600’000</td>
<td>200’000</td>
<td>350’000</td>
<td>300’000</td>
</tr>
<tr>
<td>Share of Viel Inc. (20%)</td>
<td>120’000</td>
<td>40’000</td>
<td>70’000</td>
<td>60’000</td>
</tr>
<tr>
<td>Adjustment of the investment in Ice Inc.</td>
<td>120’000 – 60’000 = 60’000</td>
<td>40’000 – 60’000 = – 20’000</td>
<td>70’000 – 60’000 = 10’000</td>
<td>60’000 – 60’000 = 0</td>
</tr>
</tbody>
</table>

d) Consolidated Balance Sheet of Viel (in CU)

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Assets 2’110 + 20% · 550</td>
<td>2’210’000</td>
</tr>
<tr>
<td>Current Assets 1’000 + 20% · 300</td>
<td>1’060’000</td>
</tr>
<tr>
<td>(*) Goodwill 60,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Investment in Ice Inc. 0</td>
<td>0</td>
</tr>
</tbody>
</table>

Long Term Debts 1’000 + 20% · 300 = 1’060’000
Short Term Debts 300 + 20% · 200 = 340,000
Shareholders Funds 1,920 + 20% 50.000 = 1,930,000

(*) 120’000 (price paid for the investment in Ice) – 20% (200’000 + 100’000) [Shareholders' Funds of Ice as of 01.01.N] = 60’000
### Question 5: Accounting

(15 points)

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Cost Model</td>
<td>Revaluation Model</td>
<td>Cost Model</td>
</tr>
<tr>
<td>Carrying amount of the production facility</td>
<td>16,000</td>
<td>18,000</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revaluation reserve</td>
<td>0</td>
<td>2,000 (1)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation + impairment loss affecting net profit</td>
<td>4,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

(1): \[2,000 = 18,000 - 16,000\]

(2): \[4,500 = 18,000 / 4\]

(3): \[13,500 = 18,000 - 4,500\]

(4): \[1,500 = 2,000 - (4,500 - 4,000)\]

(5): \[6,000 = (13,500 - 6,000) - 1,500\]